

CLAIMS

What is claimed is:

1. A ball joint comprising:
 - a housing having at least one opening and an inner chamber;
 - a ball stud disposed in said chamber of said housing and having an outer surface; and
 - a resilient member fixedly attached to said outer surface of said ball stud.
2. The ball joint according to Claim 1, wherein said ball stud has a first axis and second axis transverse to the first axis, an intersection of the first axis and the second axis defining a center of oscillation, wherein said ball stud is normally centered on the center of oscillation.
3. The ball joint according to Claim 2, wherein when a first force is applied to said ball stud, said ball stud is caused to oscillate about the center of oscillation within a predetermined angle relative to the normally centered position, and wherein the predetermined angle is within the range of from about 0 degrees to about 40 degrees.
4. The ball joint according to Claim 1, wherein said resilient member is formed of a material having a predetermined hardness to thereby apply a restoring force to maintain or return said ball stud to the normally centered position.
5. The ball joint according to Claim 1, wherein said housing includes a pair of openings.

6. The ball joint according to Claim 5, further including a cap carried by said housing about one of said pair of openings to thereby seal said one of said pair of openings and retain said ball stud within said inner chamber of said housing.

7. The ball joint according to Claim 6, wherein said cap is secured to said housing by deforming a portion of said housing about said cap.

8. The ball joint according to Claim 1, wherein said ball stud includes a ball portion and a shaft extending outwardly from said ball portion through said at least one opening.

9. The ball joint according to Claim 1, wherein said inner chamber is generally spherical shaped and an outer surface of said resilient member is generally spherical shaped.

10. The ball joint according to Claim 1, wherein said resilient ball member is fixedly attached to the outer surface of said ball stud with an adhesive.

11. The ball joint according to Claim 1, wherein an outer surface of said resilient ball member frictionally engages said inner chamber of said housing.

12. The ball joint according to Claim 1, wherein said resilient member is formed from one of rubber and neoprene.

13. A ball joint for a vehicle having steering wheel, said ball joint comprising:

a housing having at least one opening and an inner chamber;

a ball stud disposed in said chamber of said housing and having an outer surface; and

a resilient member fixedly attached to said outer surface of said ball stud, wherein said ball stud has a first axis and second axis transverse to the first axis, an intersection of the first axis and the second axis defining a center of oscillation, wherein said ball stud is normally centered on the center of oscillation, and wherein said resilient ball member is formed of a material having a predetermined hardness to thereby apply a restoring force to maintain or restore said ball stud to the normally centered position.

14. The ball joint according to Claim 13, wherein when a first force is applied to said ball stud by turning of a vehicle steering wheel, said ball stud is caused to oscillate about the center of oscillation within a predetermined angle relative to the normally centered position, and wherein the predetermined angle is within the range of from about 0 degrees to about 40 degrees.

15. The ball joint according to Claim 13, wherein said housing includes a pair of openings.

16. The ball joint according to Claim 15, further including a cap carried by said housing about one of said pair of openings to thereby seal said one of said pair of openings and retain said ball stud within said inner chamber of said housing.

17. The ball joint according to Claim 16, wherein said cap is secured to said housing by deforming a portion of said housing about said cap.

18. The ball joint according to Claim 13, wherein said ball stud includes a ball portion and a shaft extending outwardly from said ball portion through said at least one opening.

19. The ball joint according to Claim 13, wherein said inner chamber is generally spherical shaped and an outer surface of said resilient member is generally spherical shaped.

20. The ball joint according to Claim 13, wherein said resilient ball member is fixedly attached to the outer surface of said ball stud with an adhesive.

21. The ball joint according to Claim 13, wherein an outer surface of said resilient ball member frictionally engages said inner chamber of said housing.

22. The ball joint according to Claim 13, wherein said resilient member is formed from one of rubber and neoprene.

23. A tie rod end adapted for use in a vehicle having a steering wheel for controlling steerable wheels, said tie rod end comprising:

a housing having at least one opening and an inner chamber;

a stem extending outwardly from said housing;

a ball stud disposed in said chamber of said housing and having an outer surface, wherein said ball stud has a first axis and second axis transverse to the first axis, an intersection of the first axis and the second axis defining a center of oscillation, and wherein said ball stud is normally centered on the center of oscillation; and

a resilient member fixedly attached to said outer surface of said ball stud, wherein said resilient ball member is formed of a material having a predetermined hardness to thereby apply a restoring force to maintain or restore said ball stud to the normally centered position, and wherein when a first force is applied to said ball stud by turning of a vehicle steering wheel, said ball stud is caused to oscillate about the center of oscillation within a predetermined angle relative to the normally centered position, and wherein the predetermined angle is within the range of from about 0 degrees to about 40 degrees.

24. The tie rod end according to Claim 23, wherein said housing includes a pair of openings.

25. The tie rod end according to Claim 24, further including a cap carried by said housing about one of said pair of openings to thereby seal said one of said pair of openings and retain said ball stud within said inner chamber of said housing, wherein said cap is secured to said housing by deforming a portion of said housing about said cap.

26. The tie rod end according to Claim 23, wherein said resilient ball member is fixedly attached to the outer surface of said ball stud with an adhesive.